



OVERVIEW

SBIR has developed a high precision absolute spectral radiometer – the RAD9000. The system addresses a U.S. Navy requirement of increased radiometric accuracy compared to currently available systems.

The RAD9000 offers outstanding radiometric performance over both MWIR and LWIR bands, and meets U.S. government Test Accuracy Ratio (TAR) standards for today's high performance EO sensors. The RAD9000 has demonstrated:

- * NE Δ T¹: 5 mK (MWIR)
- * Radiometric Accuracy: 0.5%

The RAD9000 is designed for maximum accuracy and flexibility. Spectral filtering is achieved with a 30 position filter wheel, installed with high-transmission, narrow-bandpass spectral filters – and delivers spectral resolution ($\Delta\lambda/\lambda$) better than 2%. Spare filter wheel positions allow custom filters (broadband, CO₂ notch, etc) to be added as required. An optional 8-position expansion wheel allows addition of extra spectral filters and/or neutral density (ND) filters for measurement of high-temperature objects (500-1000°C). Such flexibility is not available using continuous variable filter (CVF) based architectures.

Notes: 1. NE Δ T is specified under the following conditions:

- IFOV = 1.7 mrad
- λ = 4 μ m or 10 μ m \pm 2% $\Delta\lambda/\lambda$
- Object Temperature = 25° C

Solutions

for Every EO Test Requirement

30 S. Calle Cesar Chavez, Suite D • Santa Barbara, Ca. 93103
ph (805) 965-3669 • fax (805) 963-3858 • <http://www.sbir.com>

FEATURES

- Two Primary Modules Including: Electro-Optics Module (EOM) and Detector Radiometry Module (DRM)
- MWIR and LWIR LN₂ Dewar DRM's Included
- F/3 Optical System
- All-Reflective 8" Ø Aperture
- 1° Field of View
- Supports Projector-Level and Stand-Alone Test Assets (blackbodies, targets etc.)
- Custom Configurable IFOV (Standard 1.67 mrad)
- Utilizes IRWindows™ Automated Test Software
- Computer-Controlled Focus from 3m to Infinity
- Accommodates a Visible CCD Sighting Camera

OPTIONS

- Radiometric Reference Module (RRM) with Dual Source Blackbodies
- Blackbody Emitting Surface Size of 8" x 8"
- 5°C to 100°C Differential Temperature Control
- > 99.5% Absolute Radiometric Accuracy when RRM is Combined with Electro-Optics Module
- Emissivity ≥ 0.998 from 2-14 µm
- Optional 8-Position DRM Expansion Wheel

GENERAL SYSTEM SPECIFICATIONS

Object Temperature Range.....	10°C to 100°C
Thermal Sensitivity.....	≤ 0.025°C ¹
Nominal Spectral Resolution.....	1.8% - ($\Delta\lambda / \lambda$)
Instrument Control.....	MS Windows-based Computer Control, IEEE-488 Interface, Network Controllable
Shock/Vibration.....	MIL-STD-648C and MIL-STD-810F

ENVIRONMENTAL SYSTEM SPECIFICATIONS

Temperature.....	15°C to 40°C (Operating) -20°C to 85°C (Storage)
Relative Humidity.....	20% to 40% Non-Condensing
Optimal Temperature Range.....	15°C to 40°C

* Specifications are subject to change without prior notice

Solutions

for Every EO Test Requirement

30 S. Calle Cesar Chavez, Suite D • Santa Barbara, Ca. 93103
 ph (805) 965-3669 • fax (805) 963-3858 • <http://www.sbir.com>

ELECTRO-OPTICS MODULE (EOM) SPECIFICATIONS

Entrance Aperture Diameter.....	200 mm
Field of View (FOV).....	± 0.5 (1° Full Angle)
Angular Resolution (IFOV).....	1.7 mrad (Variable)
Motorized Focus Adjustment.....	VIS-CCD Sighting/Alignment Capability
Focus Adjustment.....	3 m to Infinity (Computer Controlled)
User Selectable Dwell Time.....	1 sec to 10 secs
Internal Reference Source.....	Single Internal Reference for Drift Compensation
Dimensions & Mass	
EOM.....	26" x 30" x 15", 112 lbs.
CSE.....	21" x 24" x 20", 121 lbs.

DETECTOR RADIOMETRY MODULE (DRM) SPECIFICATIONS

Spectral Regions.....	MWIR (3-5 µm), LWIR (8-12 µm)
Detector Size.....	Ø 1 mm (MWIR, LWIR)
Cooling.....	Liquid Nitrogen (LN ₂)
Coolant Duration.....	~ 8 Hours
Mass.....	10.5 lbs.

RADIOMETRIC REFERENCE MODULE (RRM) SPECIFICATIONS

Radiometric References.....	2 External Calibrated Sources (5°C to 100°C)
Radiometric Accuracy.....	± 0.5%
Absolute Temperature Accuracy.....	± 0.001 x (T-25°C) or 0.01°C, whichever is greater
Temperature Range.....	-25°C to +75°C ΔT, 0°C to +100°C Absolute T
Settling Time.....	< 46 seconds
Repeatability.....	Set Point Resolution
Blackbody Stability ²	± 0.003°C Short Term, ± 0.01°C Long Term
Slew Rate.....	(0°C to -10°C) < 95 sec, (-10°C to 10°C) < 95 sec
Analog Output.....	± 5V, Scale Factor 1° C/V to 10° C/V
Dimensions & Mass	
RRM.....	44" x 12" x 18", 160 lbs.
RCM.....	21" x 24" x 24", 135 lbs.

Notes: 2. Short term is approximately 1 hr. or less and long term stability is anything over 1 hr.

* Specifications are subject to change without prior notice



Solutions

for Every EO Test Requirement

30 S. Calle Cesar Chavez, Suite D • Santa Barbara, Ca. 93103
 ph (805) 965-3669 • fax (805) 963-3858 • <http://www.sbir.com>